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ABSTRACT

A study examined longitudinal differences in the academic achievement of economically advantaged and economically disadvantaged pupils of high, average, and low academic ability in grades 2 through 9. Data used were the 1982 and 1985 Stanford Achievement Test Reading Comprehension results of the Palm Beach County, Florida, school district. The pupil population reflected a cross-section of socioeconomic backgrounds ranging from a Palm Beach resort environment to that of the migrant farm worker. Participation in the district's federal lunch program was used as the basis for sorting subjects into economically advantaged and disadvantaged groups. The reading comprehension scores were used to further divide group subjects into high, average, and low achievement subgroups. The results reinforced previous findings indicating that, as a group, economically advantaged students academically outperform economically disadvantaged students. (Tables of data are included.) (HTH)

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A Comparison of Reading Comprehension Performance of Economically Advantaged and Disadvantaged Children of Varying Initial Ability

Jose Abalos III, S. Jean Jolly, Robert Johnson
Palm Beach (Florida) County Schools

A paper presented at the annual meeting of the
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San Francisco, California

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Introduction

The difference in academic achievement between economically advantaged and disadvantaged students has been the focus of intensive research and program development since the early sixties. Significant difference in scholastic achievement between low- and middle-income groups has been noted many times in the past (Coleman, Campbell, Hobson, McPartland, Mood, Weinteld, & York, 1966; Crano, Kenny, & Campbell, 1972; Harlem Youth Opportunities, Inc., 1964; Hentoff, 1966; Kohl, 1968; Kozol, 1967). It is now widely accepted that a positive relationship exists between academic achievement and income. For example, groups of students having higher family income also have higher average test scores on the Scholastic Aptitude Test (Educational Testing Service (ETS), 1980). It must be noted, however, that within each income level students obtain the full range of SAT scores (ETS, 1980). The moderately strong correlation found when groups are the unit of analysis (r=.73) is weak when the individual is used as the unit of analysis (r=.22) (White, 1983). This apparent contradiction occurs because the magnitude of correlations tend to increase with increasing levels of aggregation (Langbien, 1977).

The mean difference in achievement between low- and middle-income groups most likely reflects the inequitable distribution of "educationally competent families" among the lower and higher social strata (Epps, 1983, pp. ix-xiii). Although families having the quality of life which optimizes a child's potential for achievement are found at every social level, fewer families in the low-income groups are likely to provide this type of home environment (Epps, 1983). A substantial base of research supports the theory that it is parental behavior, rather than socio-economic status variables such as income, which affects a child's development and subsequent performance (Clark, 1983; Clarke-Stewart & Apfel 1978; Coleman et al., 1966; Lezotte & Brookover, 1980; Manning & Manning, 1984; Shields, Gordon, & Dupree, 1983; Straw, 1983; Walberg, 1984; Wigfield & Asher, 1983). The multiple correlation between home environment variables and school achievement on the individual level is a strong .65, compared to only .22 when a general SES classification such as income is used instead (White, 1983).

In the Palm Beach County (Florida) school system, a cross-sectional analysis of Stanford Achievement Test scores was conducted, comparing achievement of students in the federal lunch program to students who did not qualify for the program (unpublished). As expected, there was a gap between the two groups at each grade level, with the gap generally growing wider with each higher grade. The divergence of students of high and low SES level was most apparent in the measurement of reading comprehension.

Studies of parental involvement suggest that children's orientation and acquisition of reading skills are greatly influenced by parents (Wigfield & Asher, 1983). In their intensive study of low SES children, Chall and Snow (1982) found that reading comprehension appeared to require complementary supports from home and school. They suggested that children from higher-income families have, in general, more access to experiences and interactions which promote acquisition of literacy, and that low-income children are less likely to come from a home environment that is optimally enriching or positive.

Reading comprehension is a skill which forms the basis of later achievement at every level of instruction. It is a skill that diverges from explicit instruction at a very early stage, possibly as early as grade three, where students are expected to generalize the reading skills they have been taught to other reading tasks (Dwyer, 1982). Consequently, low-income children, as a group, tend to start to decelerate when reading is used for learning. After the primary grades, when reading changes to acquiring new information from long, decontextualized and complex passages of texts, low-income children begin to decelerate. "The middle-class child has a better chance of learning such ideas and words at home; the low-SES child can learn them too, but needs more help from the school" (Harvard Graduate School of Education, 1985).

Purpose of the study

Educators generally think of low-income children as having low achievement in reading. Nevertheless, as the weak relationship (r=.22) between income and achievement for the individual would dictate, there will be low-income children who are average performers and those who are above-average performers. Research has shown that, as a group,

low-income students decelerate in achievement as they progress in the grades. However, it remains a question as to whether this deceleration is true for all ability levels of low-income children. In other words, do low-income children who have high, average, and low initial achievement all decelerate? Furthermore, how do the same three groups of average-income children look across time? Do these students show varying rates of gain in reading comprehension, depending on their initial achievement?

This study examined longitudinal differences in the academic achievement of economically advantaged and economically disadvantaged pupils classified into three groups -- high, average, and low -- on the basis of initial academic performance. More specifically, six research questions were posed:

RESEARCH QUESTIONS

1. Are there significant differences in the reading comprehension achievement gain scores of economically advantaged and disadvantaged pupils?

2. Are there significant differences in the reading comprehension achievement gain scores of initially high, average, and low performing pupils?

3. Is there a significant interaction between economic status and initial achievement?

4. Are there significant differences in the reading comprehension achievement gain scores of economically advantaged and disadvantaged pupils within initial performance level?

5. Are there significant differences in the reading comprehension achievement gain scores of initially high, average, and low performing pupils within economic level?

6. How do the achievement growth patterns of the six subgroups compare to each other?

Data Sources

The data used in this study were the 1982 and 1985 Stanford Achievement Test, seventh edition (SAT/7) Reading Comprehension results of the Palm Beach County (Florida) school district. The school system serves approximately 76,000 students from grades K through 12. The pupil population -- which reflected a cross-section of socioeconomic backgrounds ranging from the Palm Beach resort environment to that of the migrant farm worker -- was 63% white, 28% black, 8% Hispanic, and 1% Haitian. Thirty-eight (38) percent of the pupils received free or reduced-price lunches. Students in special education programs were not included in the study.

Procedures

The SAT/7 Reading Comprehension scores were used to generate five cohort groups composed of students that were in the initial grade in 1982 and have taken the SAT/7 in 1985. The few students that were retained over the three year period were also included which puts them one grade level below the majority of children in the cohort. The five cohorts were as follows:

Cohort I	-	SAT/7 in grades 2 and 5
Cohort II	-	SAT/7 in grades 3 and 6
Cohort III	-	SAT/7 in grades 4 and 7
Cohort IV	-	SAT/7 in grades 5 and 8
Cohort V	-	SAT/7 in grades 6 and 9

Each cohort group was divided into six subgroups:

Subgroup 1: Economically advantaged/high achievement (EA-HA)
Subgroup 2: Economically advantaged/average achievement (EA-AA)
Subgroup 3: Economically advantaged/low achievement (EA-LA)
Subgroup 4: Economically disadvantaged/high achievement (ED-HA)
Subgroup 5: Economically disadvantaged/average achievement (ED-AA)
Subgroup 6: Economically disadvantaged/low achievement (ED-LA)

Participation in the district's federal lunch program was used as the basis for sorting pupils into economically advantaged and disadvantaged groups. Assignment to initial achievement groups was determined by the students' 1982 percentile rank scores on the SAT/7 Word Study Skills subtest, which was chosen to provide a measure of pupil achievement based predominantly on the effects of school rather than home environment. Across all grades, the correlation between Reading Comprehension and Word Study Skills is around .60. The cut-off percentiles were: 1-33 (low initial achievement), 34-66 (average initial achievement), and 67-99 (high initial achievement). Note that for the purposes of this study, "initial achievement" corresponds to the beginning grade level of the cohort.

For statistical tests, the mean gain scores used in this study were the difference between the 1982 (pretest) and 1985 (posttest) scores in Reading Comprehension expressed in scaled scores. For ease of interpretation and for evaluation of educational significance, the mean gains were also reported in terms of percentile ranks.

A 2 X 3 factorial analysis of variance was used to determine whether the main effects and interaction between the two factors -- two levels of economic status (advantaged and disadvantaged) and three levels of initial academic achievement (high, average, and low) -- were statistically significant ($p < .05$). One-way analysis of variance was used to determine whether there were statistically significant differences ($p < .05$) between the three initial achievement groups within economic level. Post hoc comparisons, using Scheffe's test, were done to identify subgroups that were significantly different. To determine whether there were significant differences between the two economic groups within performance level, t-tests were used. In addition, the pre- and posttest mean scaled scores were converted to percentile ranks to graphically present the achievement growth patterns of the various subgroups.

Results

The results of the 2 (economic status) x 3 (initial achievement) factorial ANOVA for the five cohort groups are presented in Table 1. (Separate ANOVA tables for each cohort group are given in Appendix A).

Table 1. Summary Table of ANOVAs on Economic Status and Initial Achievement Level (Based on Mean Scaled Score Gains)

Cohort	F-values		
	Economic Status (ES)	Initial Achievement (IA)	ES x IA Interaction
I	43.18**	50.02**	1.10
II	36.67**	3.71*	1.18
III	0.04	39.31**	5.20*
IV	10.75*	6.37*	1.60
V	7.21*	0.51	0.90

**p<.001
*p<.05

Question 1: Are there significant differences in the Reading Comprehension achievement gain scores of economically advantaged and disadvantaged pupils?

The main effect of economic status was found to be statistically significant in four of the five cohorts examined. This result was found to be highly significant in the first two cohorts ($p < .001$). The mean scaled score gains for each of the economic status subgroups across the five cohort groups are given in Table 2. The percentile rank equivalents are given in Table 2a.

Table 2. Mean Scaled Score Gains and Standard Deviations of Economically Advantaged and Disadvantaged Students Across Cohorts

Cohort	Economic Status					
	Advantaged			Disadvantaged		
	Mean	Std. Dev.	N	Mean	Std. Dev.	N
I	72.4	42.02	1844	67.1	40.58	1372
II	51.0	34.47	1951	44.4	32.65	1446
III	44.8	34.48	2091	47.9	31.11	1511
IV	35.0	36.92	2449	31.9	32.11	1464
V	25.9	33.76	2591	22.2	30.92	1218

Table 2a. Mean Gain Scores of Economically Advantaged and Disadvantaged Students Expressed in Percentile Ranks

Cohort	Economic Status		Difference (Adv - Dis)
	Advantaged	Disadvantaged	
I	+ 3	- 6	+ 9
II	- 3	-10	+ 7
III	- 2	- 2	0
IV	+ 1	0	+ 1
V	+ 6	+ 3	+ 3

In the four cohort groups where the main effect of economic status was found to be significant, economically advantaged pupils had significantly higher mean gain scores than economically disadvantaged pupils as shown in Tables 2 and 2a. In Cohort III, the economically disadvantaged pupils had a higher mean scaled score gain than economically advantaged pupils, but this difference was found to be non-significant. Both economic status groups in Cohort III lost two percentile points from 1982 to 1985. Differences in

percentile rank gains between economically advantaged and economically disadvantaged pupils range from 1 to 9, with the higher differences noted in the lower grade levels.

Question 2: Are there significant differences in the Reading Comprehension achievement gain scores of initially high, average, and low performing pupils?

The main effect of initial achievement was found to be statistically significant for Cohorts I to IV but not for Cohort V. Among the initial achievement groups, the initially low achieving pupils had higher mean gain scores than the initially high and average achieving pupils. This result was noted in Cohorts I to IV but not in Cohort V where the main effect of initial achievement was found to be non-significant. To identify where the significant differences are among the initial achievement subgroup means, post hoc comparisons were done using Scheffe's test. These results are shown in Table 3.

Table 3. Post Hoc Comparisons Among Initial Achievement Mean Gain Scores

Cohort	Initial Achievement Level		
I	Low (77.3)	Average (66.3)	High (63.0)
II	Low (48.9)	High (47.7)	Average (47.6)
III	Low (51.0)	Average (47.0)	High (37.4)
IV	Low (36.2)	High (33.0)	Average (32.2)
V	High (26.4)	Average (24.1)	Low (23.9)

Note: Underlined mean scores denote no significant difference.

Table 3a. Mean Gain Scores in Percentile Rank by Initial Achievement Level

Cohort	Initial Achievement Level		
I	Low (-1)	Average (-3)	High (-4)
II	Low (-2)	Average (-5)	High (-7)
III	Low (1)	Average (-1)	High (-4)
IV	Low (4)	Average (0)	High (0)
V	Average (5)	High (4)	Low (4)

It will be noted in Table 3 that the mean gain scores of average and high initial achievement students did not differ significantly. The only exception to this is in Cohort III where the three mean scores were significantly different from each other. In all cases, except in Cohort V where the main effect of initial achievement was found to be non-significant, the initially low achieving students registered the largest scaled score gains. These mean gains were found to be significantly greater than those of the average and high initial achievement students. This might be somewhat attributed to a regression to the mean effect. (Note: The correlation between Reading Comprehension and Word Study Skills, the blocking variable, is about .60). The mean gain scores in percentile rank are given in Table 3a.

Question 3: Is there a significant interaction between economic status and initial achievement?

Across all the cohort groups, with the exception of Cohort III, there was no significant interaction between economic status and initial achievement level as shown in Table 1. This lack of interaction indicates that the difference in performance between the economically advantaged and the economically disadvantaged is unaffected by initial

achievement. This is clearly evident from the data presented in Table 4 for Cohorts I, II, IV and V.

The significant interaction noted for Cohort III indicate that the difference in the mean scaled score gains between the economically advantaged and economically disadvantaged groups is affected by the initial achievement level. As shown in Table 4, the economically disadvantaged had a higher mean gain than the economically advantaged for the initially high achieving group. The reverse is true for the initially low achieving group. No difference was noted between the two economic status groups for the initially average achieving group.

Question 4: Are there significant differences in the Reading Comprehension achievement gain scores of economically advantaged and economically disadvantaged pupils within initial performance level?

Within each initial achievement level, the mean gains of economically advantaged and disadvantaged groups were compared across the five cohorts using the t-test for independent samples. The results are shown in Table 4.

Table 4. t-test for Economic Status Groups within Initial Achievement Levels (Based on Mean Scaled Score Gains)

		Economic Status								
		Advantaged			Disadvantaged					
Cohort	Initial Achievement	Mean Gain	SD	N	Mean Gain	SD	N	t-value	df	Prob.
I	High	64.5	41.73	575	57.6	47.11	163	1.698	238.8	0.091
	Average	70.3	39.22	703	59.5	40.43	427	4.410	878.1	0.000
	Low	82.9	43.60	566	73.2	38.00	782	4.239	1115.5	0.000
II	High	50.2	37.06	500	39.0	37.34	145	1.536	248.0	0.126
	Average	50.4	32.88	802	42.7	31.93	444	2.103	860.8	0.036
	Low	52.4	34.33	649	46.2	32.06	857	3.613	1287.7	0.000
III	High	36.0	35.71	695	42.7	33.87	173	-2.313	275.1	0.021
	Average	47.0	34.14	859	47.0	32.42	528	-0.013	1159.4	0.990
	Low	52.6	30.83	537	50.0	29.46	810	1.757	1111.7	0.079
IV	High	34.6	39.77	992	26.5	36.41	254	3.097	421.1	0.002
	Average	34.0	36.23	846	28.9	32.75	459	2.613	1023.5	0.009
	Low	37.0	32.83	611	35.5	29.67	751	0.875	1243.5	0.382
V	High	26.4	35.03	928	26.2	31.04	194	0.097	305.0	0.923
	Average	25.6	33.10	1008	20.4	32.31	408	2.722	770.1	0.007
	Low	25.5	32.96	655	22.1	29.86	616	1.959	1267.2	0.050

Table 4a. Mean Gain Scores in Percentile Rank for Economic Status Groups within Initial Achievement Levels

Cohort	Initial Ach.	Economic Status: Advantaged Mean Gain	Advantaged N	Disadvantaged Mean Gain	Disadvantaged N	Difference (Adv - Dis)
I	High	- 3	575	- 9	163	+ 6
	Average	0	703	- 9	427	+ 9
	Low	+ 5	566	- 5	782	+10
II	High	+ 1	500	-10	145	+11
	Average	- 2	802	-10	444	+ 8
	Low	- 4	649	- 8	857	+ 4
III	High	- 5	695	- 3	173	- 2
	Average	0	859	- 2	528	+ 2
	Low	+ 1	537	0	810	+ 1
IV	High	+ 1	992	- 5	254	+ 6
	Average	+ 1	846	- 3	459	+ 4
	Low	+ 4	611	+ 4	751	0
V	High	+ 3	928	+ 6	194	- 3
	Average	+ 5	1008	+ 2	408	+ 3
	Low	+ 6	655	+ 3	616	+ 3

In general, the economically advantaged group registered higher mean scaled score gains than the economically disadvantaged groups regardless of initial achievement level. The only exception to this trend are the high and average achieving groups in Cohort III. As shown in Table 4, the differences between the mean gain scores between the two economic status groups were either significant or approached statistical significance in most cases.

The mean gain scores in percentile rank are given in Table 4a. In all but three instances, economically advantaged pupils registered a higher mean gain score than economically disadvantaged pupils. Differences in percentile rank mean gain scores between the two economic status groups ranged from a low of -3 to a high of 11, with a mean difference of about 4 percentile points. It will be noted that there is more variability among the differences of the high initial achievement groups than those of the low or average achieving groups. Note also that for both low and average achieving groups, the economically advantaged group had higher mean gains than the economically disadvantaged group with the exception of the low achieving group in Cohort IV where no difference was noted.

Question 5: Are there significant differences in the Reading Comprehension achievement gain scores of initially high, average, and low performing pupils within economic level?

Table 5. One-way ANOVA for Initial Achievement Level within Economic Level (Based on Mean Scaled Score Gains)

		Initial Achievement				
		High	Average	Low	F	Prob.
Economically Advantaged						
Cohort	I	64.5	70.3	82.9	29.49	0.000
	II	50.2	50.4	52.4	0.76	0.467
	III	36.0	47.0	52.6	39.58	0.000
	IV	34.6	34.0	37.0	1.27	0.280
	V	26.4	25.6	25.5	0.18	0.833
Economically Disadvantaged						
Cohort	I	57.6	59.5	73.2	21.41	0.000
	II	39.0	42.7	46.2	3.90	0.020
	III	42.7	47.0	50.0	3.94	0.020
	IV	26.5	28.9	35.5	10.54	0.000
	V	26.2	20.4	22.1	2.29	0.101

Table 5a. Mean Gain Scores in Percentile Rank by Initial Achievement within Economic Level

		Initial Achievement		
		High	Average	Low
Economically Advantaged				
Cohort	I	- 3	0	+ 5
	II	+ 1	- 2	- 4
	III	- 5	0	+ 1
	IV	+ 1	+ 1	+ 4
	V	+ 3	+ 5	+ 6
	Mean Gain	- 0.6	+ 0.8	+ 2.4
Economically Disadvantaged				
Cohort	I	- 9	- 9	- 5
	II	-10	-10	- 8
	III	- 3	- 2	0
	IV	- 5	- 3	+ 4
	V	+ 6	+ 2	+ 3
	Mean Gain	- 4.2	- 4.4	- 1.2

As shown in Table 5, significant differences were found among initial achievement level groups across Cohorts I to IV for the economically disadvantaged group. The probability for Cohort V approached significance (p=.101). For the economically advantaged group, Cohorts I and III registered significant differences.

The mean gain scores expressed in percentile rank for the three initial achievement levels within economic status groups are shown in Table 5a. The economically disadvantaged groups, regardless of initial achievement level, showed negative mean gains when averaged across cohorts. For this group, the highest deceleration was noted in the average and high initial achievement levels (-4.4 and -4.2, respectively). The low achieving group showed a mean gain of -1.2 percentile points. Within the economically advantaged group, the low achieving group registered the highest mean gain (2.4) while the high achieving group registered a slight loss (-.6). The average achieving group showed a mean gain of .8 percentile points.

The result of the post hoc comparisons to determine where the significant differences are among the initial achievement level groups are shown in Table 6.

Table 6. Summary of Post Hoc Comparisons of Mean Gain Scores by Initial Achievement Levels

	Economic Status					
	Advantaged			Disadvantaged		
Initial Achievement:	H-A	A-L	H-L	H-A	A-L	H-L
Cohort						
I	S	S	S	NS	S	S
II	NS	NS	NS	NS	S	NS
III	S	S	S	NS	NS	S
IV	NS	NS	NS	NS	S	S
V	NS	NS	NS	S	NS	NS

Note: Post Hoc comparisons were made using Scheffe's test.
S - Significant at the 0.05 level.
NS - Not significant at the 0.05 level.

It will be noted that within the economically disadvantaged group, significant differences were found mostly between the mean gain scores of Average and Low achieving pupils and High and Low achieving pupils in most cohorts. Among the economically advantaged group, significant differences were noted among the three achievement groups for Cohorts I and III.

Question 6: How do the achievement growth patterns of the six subgroups compare to each other?

To compare achievement growth patterns, the pretest and posttest percentile rank scores for the six subgroups were plotted for each cohort. These plots are shown in Figures 1 to 5.

Figure 1

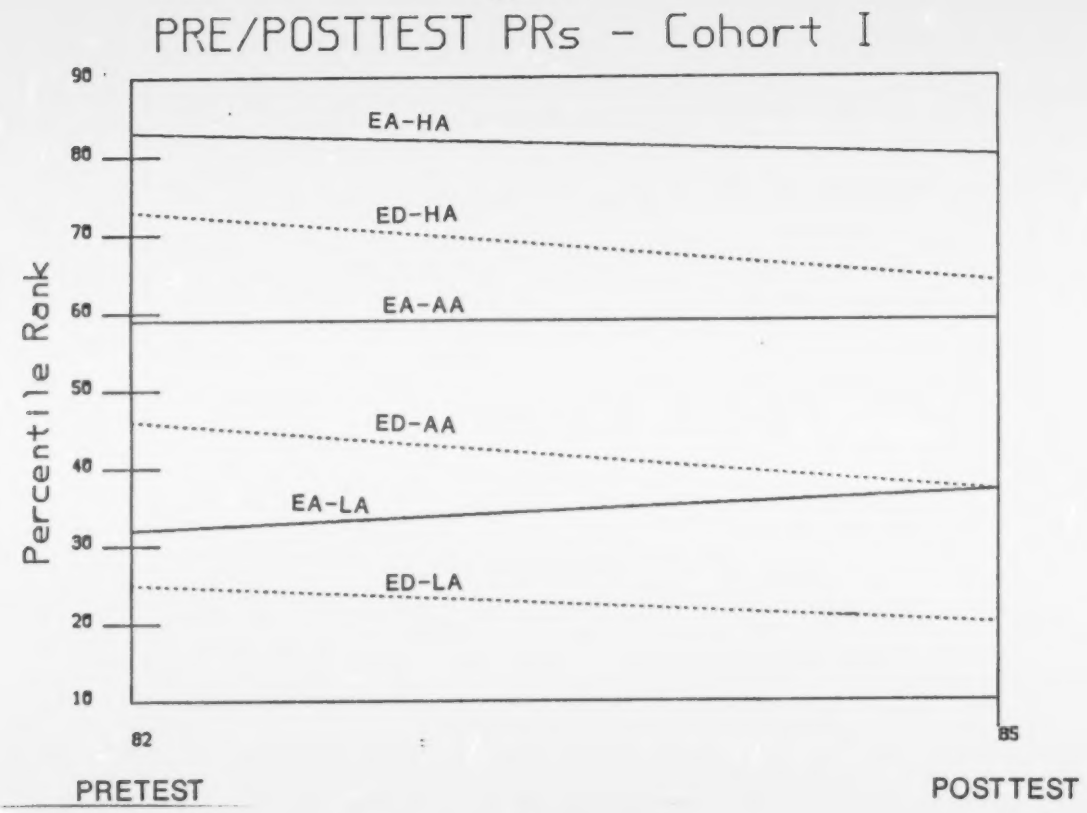


Figure 2

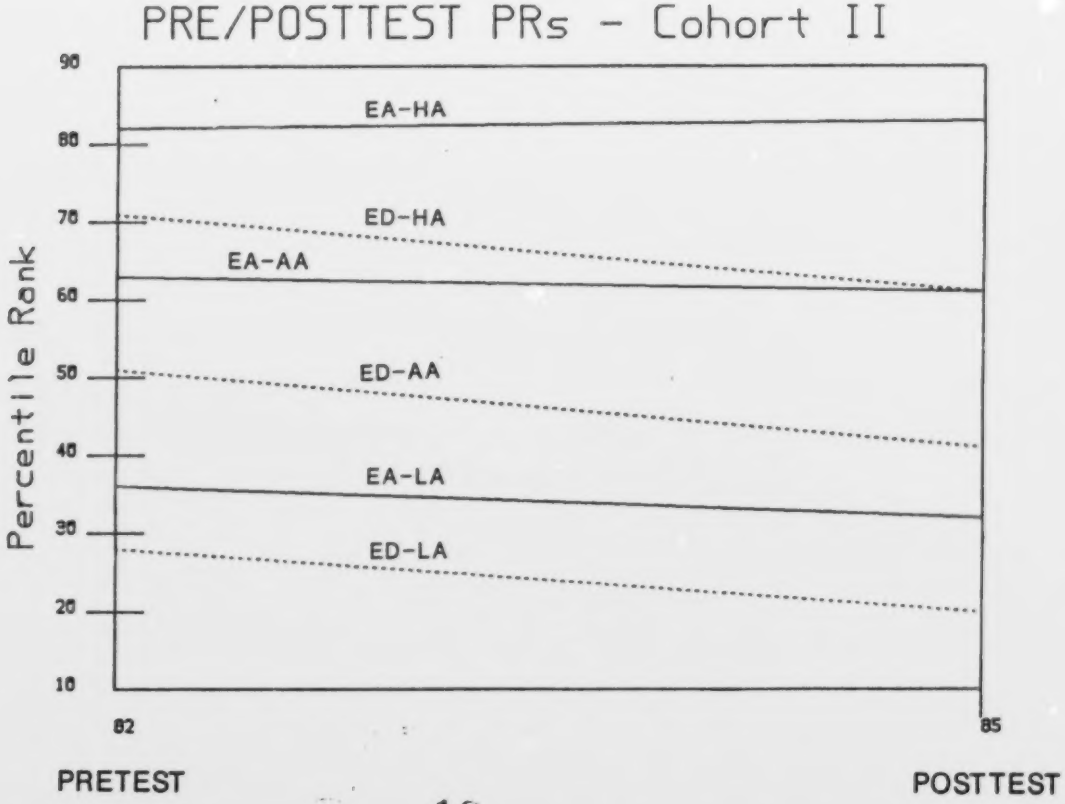


Figure 3

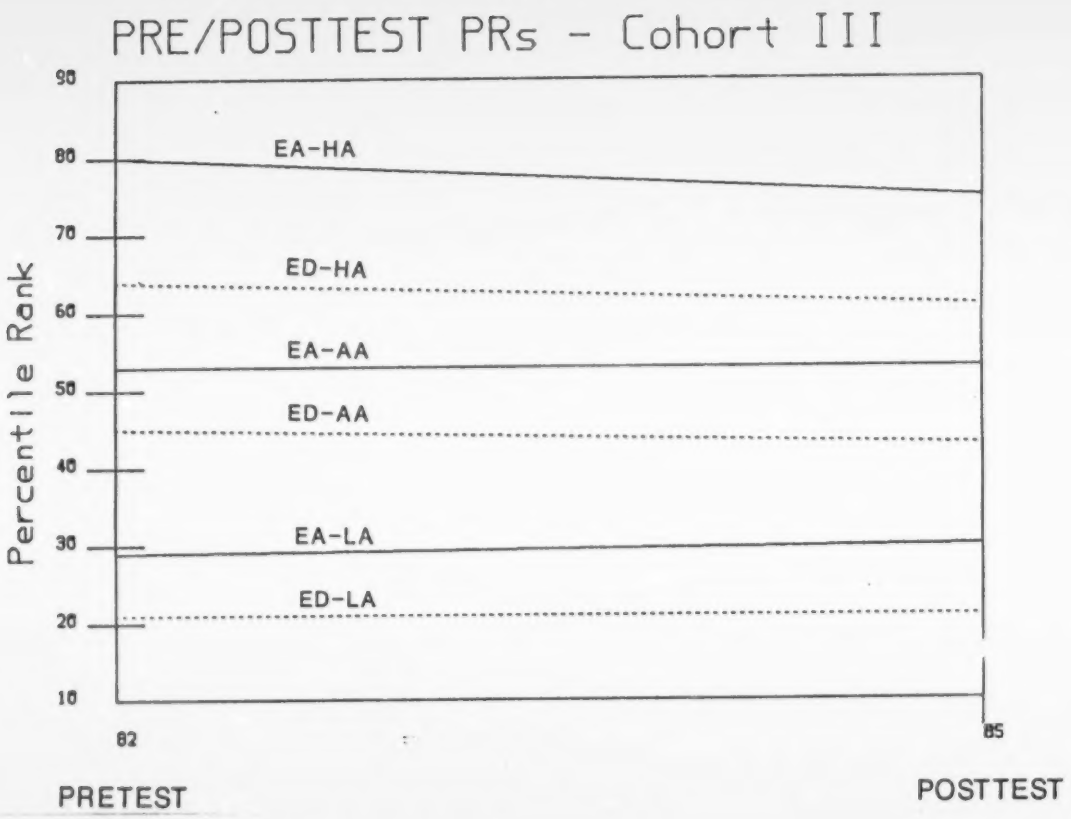


Figure 4

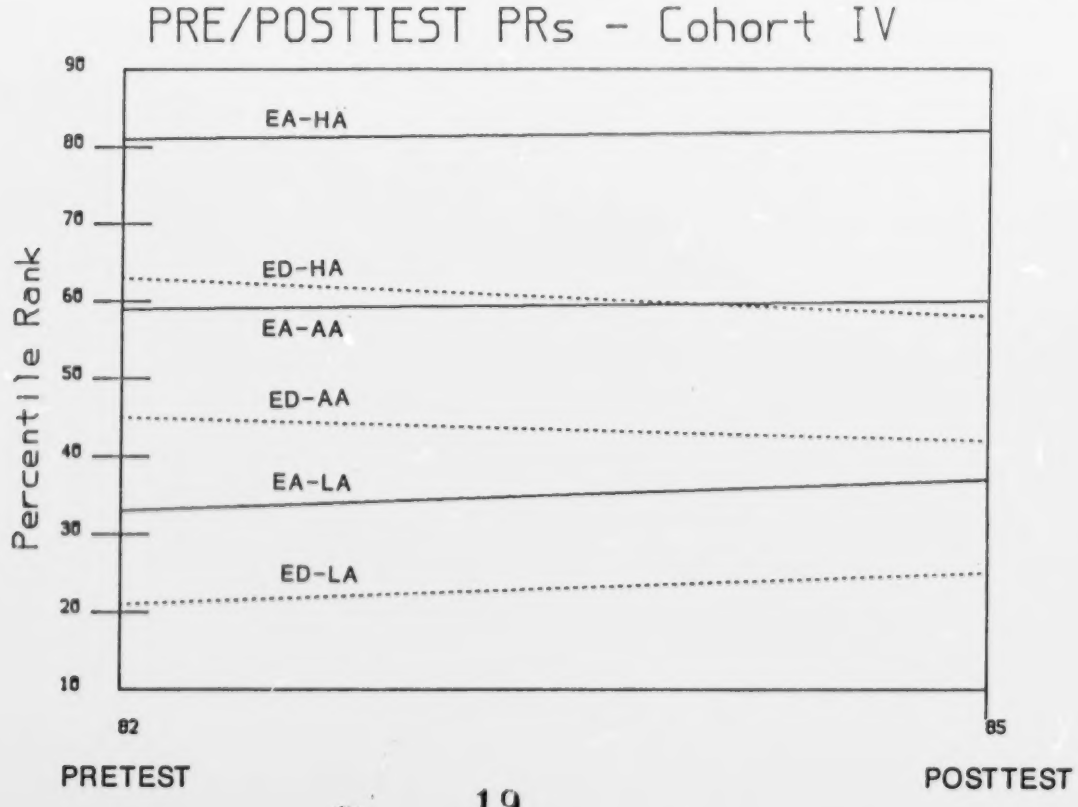
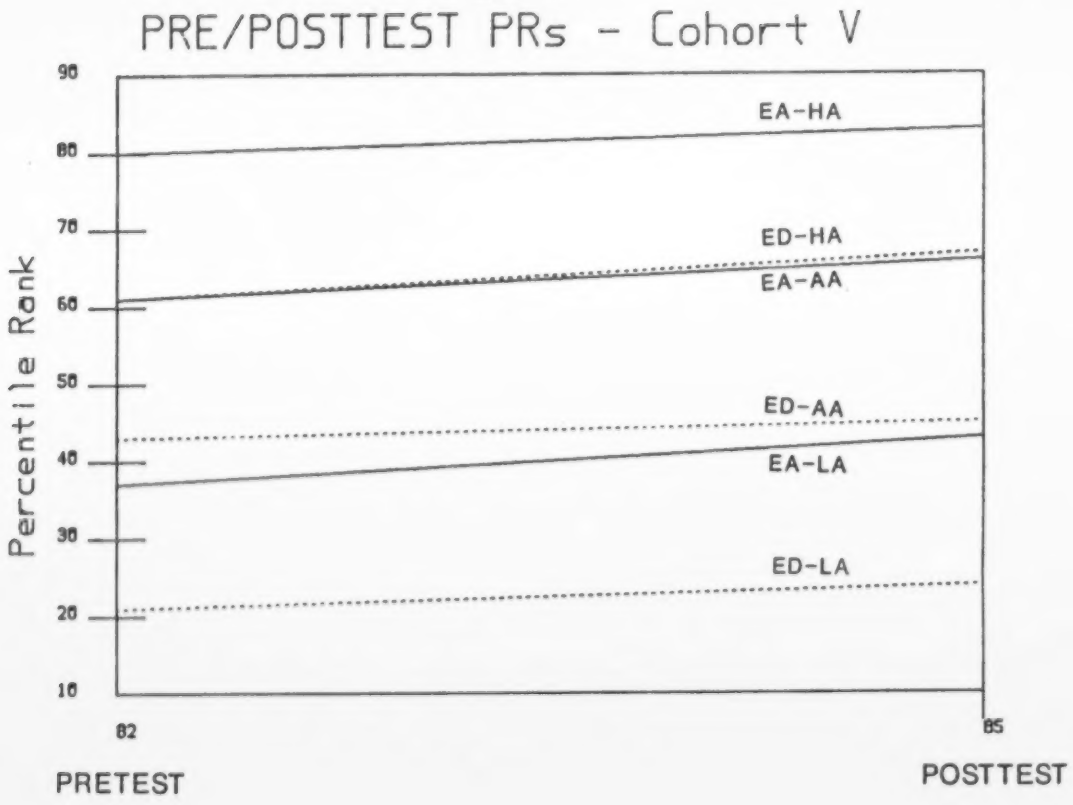


Figure 5

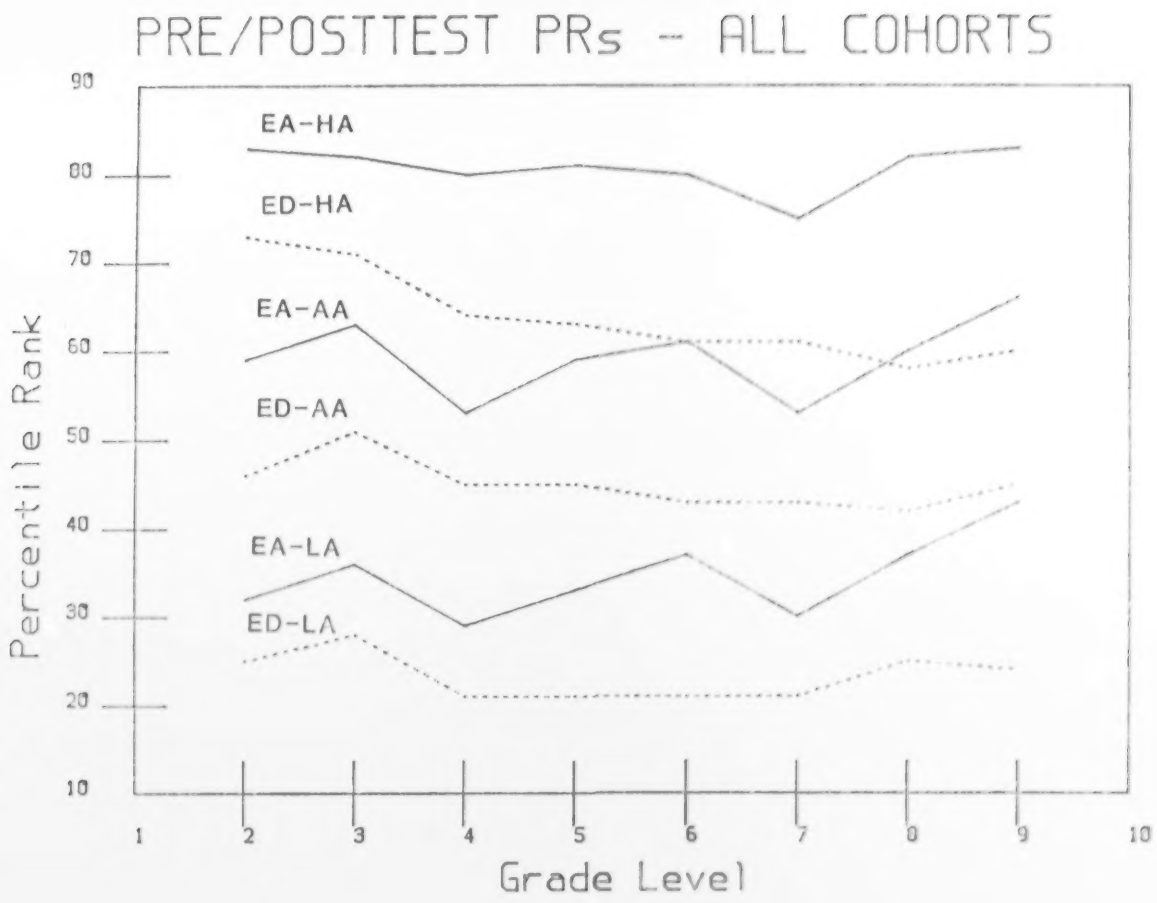

PRE/POSTTEST PRs - Cohort V
Percentile Rank
90
80
70
60
50
40
30
20
10
EA-HA
ED-HA
EA-AA
ED-AA
EA-LA
ED-LA
82
85
PRETEST
POSTTEST

In general, as Figures 1 through 5 show, economically advantaged pupils showed higher pre- and posttest percentile rank scores than economically disadvantaged pupils within each achievement level. It will also be noted that the gap between the two economic status groups widened across the four years by as much as 11 percentile points. This trend was most evident in Cohorts I and II. In most of the cohorts, a decelerating growth pattern was noted for the economically disadvantaged groups while an accelerating or maintenance growth pattern was noted for the economically advantaged groups. What is most noteworthy is the diminishing gap between the economically advantaged group in one achievement level and the economically disadvantaged group in the next higher achievement level. For example, in Cohort II (Figure 2), the difference in pretest scores of the EA-LA and ED-AA groups is 14 percentile points but their posttest percentile ranks were the same after four years.

Major Findings

The findings of the present study strongly reinforce what has generally been established by numerous researchers, i.e., as a group, economically advantaged pupils academically outperform economically disadvantaged pupils. The results of this study showed that significant difference in reading comprehension between the economic groups held for most initial achievement levels across the five cohorts. Not only did this difference not decrease across years but it increased as the groups progressed through the grades. For example, in Cohort I (shown in Figure 1), economically advantaged children who scored below average in reading comprehension at the end of grade two showed improved performance by grade five, while the economically disadvantaged children showed a decline. This trend was also observed for the initially high and average achieving groups. In short, as a group, economically disadvantaged students, regardless of initial achievement, do not catch up with the economically advantaged in reading comprehension. On the contrary, as evidenced by the findings of this study, economically disadvantaged students, as a group, tend to decline in percentile ranking. Another important observation based on Ahe growth curves is the narrowing gap between the economically advantaged at a given initial achievement level and the economically disadvantaged at the next higher initial achievement level. These gaps did not only narrow, but in some cohorts, they either overlapped or crossed-over (see Figure 4 for example). The only exception to the general findings were the results of Cohort III which covered the range from grades 4 to 7. Plotting the percentile rank scores across grades (see Figure 6) revealed some abnormalities in the scores of the six groups in grade 7. Further research will be necessary before an attempt is made to explain the deviation of Cohort III from the other four cohort groups in the study.

Figure 6


PRE/POSTTEST PRs - ALL COHORTS
Percentile Rank
90
80
70
60
50
40
30
20
10
EA-HA
ED-HA
EA-AA
ED-AA
EA-LA
ED-LA
1
2
3
4
5
6
7
8
9
10
Grade Level

Discussion and Recommendations

Thorndike (1973), in a study involving 15 countries, found that a positive relationship existed between income and reading achievement. He also noted that the parents' education and reading resources in the home (e.g., number of books, ownership of a dictionary, and subscription to a daily newspaper) "can operate on the child by way of his motivation and the learning environment provided him" (p. 538). Additionally, Gibson and Levin (1975) noted that linguistic interaction between child and parent, which is highly relevant to reading achievement, is likely to take place less frequently in low-income homes. There, conversation directed to the child may be too infrequent for him to participate actively.

It is likely that in the present study economically advantaged and disadvantaged parents as groups may be offering differential support or facilitation of their childrens' efforts in school. Not only did the economically disadvantaged children enter school with an educational disadvantage, they fell further behind throughout the elementary grades. It is highly likely that these children, as a group, had a less optimal pre-school environment and that their out-of-school environment is less optimal than those of the advantaged group during the years that reading instruction is taking place in the school. As Chall and Snow's (1982) research showed, at each stage of reading, the child's out-of-school environment can contribute to or hinder the acquisition of reading skills:

> For low-income children as compared to children from middle class homes, while discrepancies have been reported at the pre-reading and beginning reading stages, they seem to grow wider during Stage 2 (grades 2-3; ages 7-8), perhaps partly because fewer books are available to them. By Stage 3 (grades 4-8; ages 9-13), the gap seems to widen even more, since the ability to read for information, knowledge and pleasure assume a broad vocabulary, much previous knowledge, and high skills in decoding and fluency. (p. 12)[Underline ours.]

Cohort I, which had moved into Stage 3, showed this widening gap.

These results have serious implications for federal compensatory education programs. As presently operating, the ECIA Chapter I (formerly the ESEA Title I) program serves only 40% of low-income children nationwide (Carter, 1984). The program also serves low

achieving, middle-income children who attend schools with a heavy concentration of low SES students. This means that the economically disadvantaged children who are average or above average in achievement and whose scores tend to decelerate across time are not given the needed academic service to reverse the decelerating trend. Our data showed that this group constituted about 20 percent of the total student population and about half of the economically disadvantaged population in the district. Since these students tend to decelerate in performance across time, it may be necessary to develop a method for selecting those who are most at risk due to home environment and provide assistance through compensatory education.

Furthermore, in the evaluation of compensatory education programs, it may be necessary to change expectations of progress. In the Sustaining Effects Study, Carter (1984) inferred that the gains of Title I students varied with their initial achievement level. Consequently, the expectation for achievement gain of such programs may need to be addressed in terms of student background and initial achievement levels, instead of uniform expected outcomes.

Finally, the results of this study have very strong implications for instruction of economically disadvantaged students in reading comprehension. Teachers must be reminded that the relationship between income and achievement is weak but that the relationship between home environment and achievement is moderately strong. Among any group of economically disadvantaged children there are likely to be a large number whose home environments do not support the teacher's efforts. The rich language experience which lends itself to high performance in reading comprehension will be lacking for many of the economically disadvantaged children, but not for all. The teacher of economically disadvantaged children must offer many of those children the language experience of which they have been deprived. Even more importantly, the schools must have high expectations of success which must be conveyed to the children and to their parents. The school effectiveness movement, as originally conceptualized by Ron Edmonds (1981), focuses on the necessity of believing that schools can make a difference in increasing achievement of economically disadvantaged children.

APPENDIX A

Table A. Analysis of Variance for Economic Level and Initial Achievement Level, Reading Comprehension, Cohort I

Source	df	MS	F
Economic Group (A)	1	71503.50	43.18**
Initial Achievement Level (B)	2	82820.06	50.02**
A x B	2	1820.69	1.10
Residual	3076	1655.79	
Total	3081	1716.41	

**p<.001

Table B. Analysis of Variance for Economic Level and Initial Achievement Level, Reading Comprehension, Cohort II

Source	df	MS	F
Economic Group (A)	1	39823.11	35.67**
Initial Achievement Level (B)	2	4142.25	3.71*
A x B	2	1313.34	1.18
Residual	3197	1116.38	
Total	3202	1128.38	

**p<.001
*p<.05

Table C. Analysis of Variance for Economic Level and Initial Achievement Level, Reading Comprehension, Cohort III

Source	df	MS	F
Economic Group (A)	1	39.48	0.04
Initial Achievement Level (B)	2	41527.50	39.31**
A x B	2	5490.10	5.20*
Residual	3346	1056.33	
Total	3351	1084.85	

**p<.001
*p<.05

Table D. Analysis of Variance for Economic Level and Initial Achievement Level, Reading Comprehension, Cohort IV

Source	df	MS	F
Economic Group (A)	1	13159.19	10.75*
Initial Achievement Level (B)	2	7800.32	6.37*
A x B	2	1963.92	1.60
Residual	3644	1224.47	
Total	3649	1230.19	

*p<.05

Table E. Analysis of Variance for Economic Level and Initial Achievement Level, Reading Comprehension, Cohort V

Source	df	MS	F
Economic Group (A)	1	7641.57	7.21*
Initial Achievement Level (B)	2	540.25	0.51
A x B	2	952.31	0.90
Residual	3407	1060.55	
Total	3412	1062.58	

*$p<.05$

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